BELL TELEPHONE MAGAZINE

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- New Look at The 1960's
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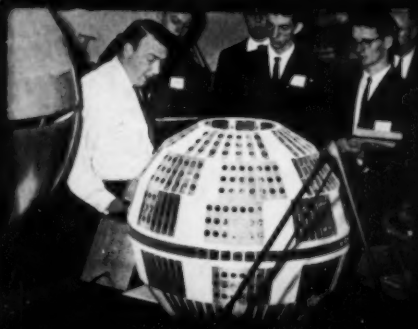
- New Services for Brokers

SUMMER 1961



VOLUME XL NUMBER TWO SUMMER 1961

BELL TELEPHONE MAGAZINE

A non-technical review, published quarterly to give Bell System management people a broader view of the history, objectives, operations, and achievements of this business than they might attain in the course of their day-to-day occupations, and an added sense of participation in the problems and accomplishments of our nation-wide public service.

COVER: This distinctive pattern was designed by well-known commercial artist B. Brussel-Smith, who used relief etching on copper plate to achieve unusual color effects. Photographs, illustrating this issue's contents, are: lower left making the solar cell; lower right—our 2 millionth share owner; center—SAVE engineer at work; upper right—Labs visitors see experimental communications satellite.

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A MEDIUM OF SUGGESTION and A RECORD OF PROGRESS

GEORGE B. TURRELL, JR., *Editor* SALVATORE J. TAIBBI, *Art Editor*

Published for the Bell System by the Public Relations Department, American Telephone and Telegraph Company, 195 Broadway, New York 7, N.Y.

FREDERICK R. KAPPEL, *President* ALLEN G. BARRY, *Secretary* L. CHESTER MAY, *Treasurer*

The Two Millionth *share owners, Mr. and Mrs. Hugh T. Polson, are seen with their daughter Kay Louise, 9, and son Stephen Hugh, 7, in front of their home in Wichita, Kansas. The Polson family came to New York City as guests of A.T.&T.*

The "Two Millionth"

The owner of a neighborhood drug store in Wichita, Kansas, and his wife were saluted by A. T. & T. on July 26 as the firm's two millionth share owners

HUGH T. POLSON, 40, his wife, Irene, 39, and their two children—Kay Louise, 9, and Stephen Hugh, 7—came to New York as guests of the Company to receive A. T. & T. stock certificate No. 2,000,000.

President Kappel presented the milestone certificate to the family during a ceremony at A. T. & T. headquarters. In introducing the Polsons to a representative cross-section of A. T. & T. employees, Mr. Kappel said:

"This is an historic occasion. This is the first time that any company in the world ever reached a point where it had two million owners. Only in America could something like this happen. I think this is real evidence of how well the American free enterprise system operates. It is also the most convincing vote of confidence any business could hope for.

"The support and confidence of our share owners make it possible for us to provide good and improving communications service. And it is just as true that if we did not provide good service, we would not have such widespread share owner support.

"As our two millionth share owners, Mr. and Mrs. Polson symbolize the tens of thousands of people whose confidence in our future has led them to invest their savings in this business."

The Polsons jointly purchased five shares of A. T. & T. stock. They bought them as part of a diversified investment plan set up to provide for their children's education.

Mr. Kappel also presented the Polsons with a newly designed push-button Princess telephone bearing the inscription:

"Presented to Mr. and Mrs. Hugh T. Polson, Two Millionth A. T. & T. Share Owners, July 26, 1961."

The presentation came a little more than a decade after A. T. & T. ownership reached the one million mark. It was on May 15, 1951, when Mr. and Mrs. Brady Denton of Saginaw, Michigan, came to New York to receive Certificate No. 1,000,000.

"Since 1951," Mr. Kappel said, we have introduced literally hundreds of new services and products, which have increased the speed, convenience and scope of telephone service."

Mr. Kappel also described A. T. & T.'s plans for a satellite communications system, and gave a brief rundown on the Bell System's contributions to science and defense. He referred to the System's three principal entities—Bell Telephone Laboratories, the Western Electric Company and the Operating Telephone Companies—as "an effective and inseparable triumvirate."

Mr. Kappel noted that Wichita was among the more than 21,000 American cities, towns and villages in which A. T. & T. share owners live. Individuals own 94 per cent of all A. T. & T. stock, the most widely held in the world. About 1,400,000 persons have fewer than 100 shares, 335,000 persons hold between one and ten shares, 495,000 persons own between 11 and 30 shares,

nearly 230,000 own 31 to 49 shares and 350,000 own 50 to 99 shares.

After the ceremony, the Polsons were luncheon guests of A. T. & T. employees. Thursday's schedule called for a visit to the New York Stock Exchange and the Bell Laboratories at Murray Hill, New Jersey, followed by a tour of Washington, D. C., on Friday and Saturday.

Both Mr. and Mrs. Polson are native Kansans. He was born at Moline and she at Hoisington. They met in 1947 while she was working for Southwestern Bell at Topeka and he was studying pharmacy at the University of Kansas.

Hugh T. Polson, one of five children, was the son of a pharmacy owner at Moline. After his graduation from high school there, he attended Washburn College in Topeka before entering the Navy during World War II. He saw duty in the Pacific battles of Saipan, Tinian and Okinawa.

Stock certificate *No. 2,000,000 was given to the Polsons by A.T.&T. President Frederick R. Kappel. Here, daughter Kay Louise is seen trying out the newly designed push-button Princess telephone which Mr. Kappel presented to the family.*

After the war, he studied pharmacy at Kansas and then transferred to Idaho State College at Pocatello, where his family had moved. He and Mrs. Polson were married at the end of his sophomore year.

After college, Mr. Polson was called back into the service for the Korean War. The couple's first child was born at Mare Island Naval Hospital, where Polson served as a pharmacist.

Mr. Polson worked as a drug salesman at Hays, Kansas, after the war and saved his money. In 1954, the family moved to Wichita and bought the pharmacy he now operates. He described the pharmacy as "sort of a neighborhood store" that carries a variety of items besides drugs.

"I have tried to build it up by giving good service and by trying to be a good neighbor," he said.

Frequently, Mrs. Polson said, her husband goes to the pharmacy at night to make up a prescription for somebody who needs it in a hurry.

"We have two children," she said, "and we know that sickness is a 24-hour problem."

For several years, Mr. Polson put in a 13-hour day, seven days a week. Now he has help and, as he put it: "My hours are down from 90 a week to 60."

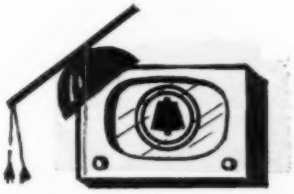
Despite his work schedule, Mr. Polson is a member of the Pleasant Valley Lions Club at Wichita, is chairman of the Interprofessional Relations Committee of the Kansas State Pharmaceutical Association and is past president of the Kansas South Central Area Pharmaceutical Association. He also is active in the Little League, in which his son plays, and in YMCA affairs.

Mrs. Polson has taught Sunday school at the Trinity Presbyterian Church near their home and participates in Girl Scout and PTA activities.

Educational television has proved itself as a powerful educational tool. The Bell Companies are actively seeking opportunities to help educators put it to maximum use

ETV—A Progress Report

William S. Brown, Jr., *Product Marketing Supervisor*
MARKETING DEPARTMENT, A. T. & T. CO.



IN THE SUMMER 1959 issue of this magazine, there was an article by Caldwell Buck entitled, "Educational Television—A New Field of Service." In his article, Mr. Buck reminded his readers that the Bell Companies had had ". . . a key role in the growth of commercial television," and predicted that, ". . . if educational television fulfills its present promise the Telephone Companies may be called upon to play a somewhat similar role again."

At the time Mr. Buck's article appeared, there were 43 ETV broadcast stations and about 150 closed circuit TV systems in operation. Today, a scant two years later, 13 more video broadcast stations devoted to education have been activated and the closed circuit networks have been increased to well over 200.

This growth is only one indication of the enthusiastic support many educators are giving this powerful and versatile teaching tool. Today, there is no longer any question that TV can play an increasingly important role in education. As we will shortly see, various successful experiments have established this fact conclusively.

The Bell Companies, too, have demonstrated that they are not only well-qualified but eager to help expand the use of ETV. We are actively seeking opportunities to share our knowledge and experience in this important service. In fact, we regard the burgeoning ETV field as an important marketing challenge.

But before discussing the ways in which the Bell System can contribute, here are some important facts about the status of ETV today and its potential for the years ahead.

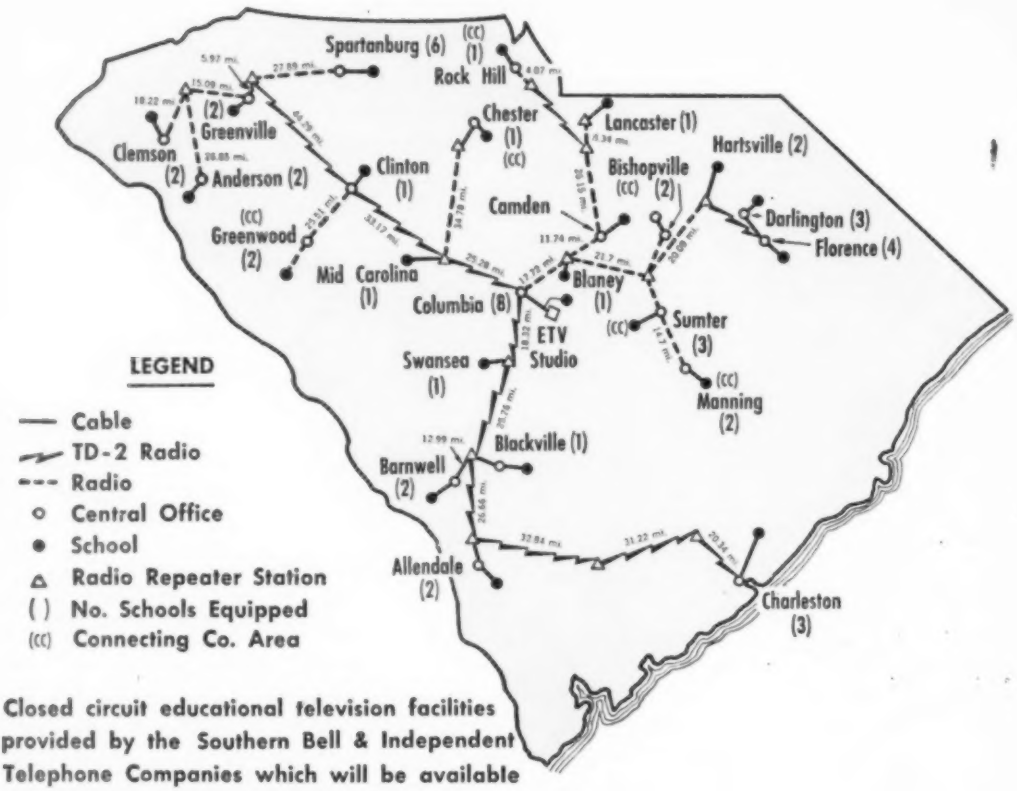
ETV Today and Tomorrow

The 56 ETV broadcasting stations now in operation concentrate on cul-

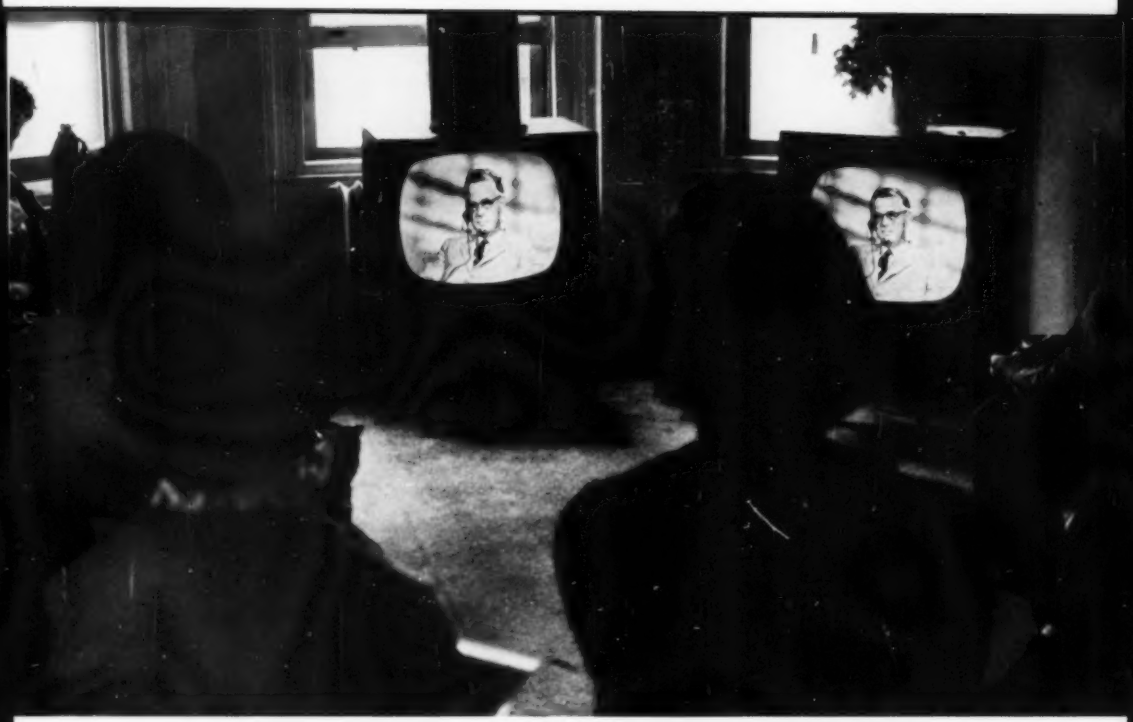
tural programs primarily directed to the adult audience during evening hours. However, they do provide some kind of in-school programs for about six per cent of the school population. About one per cent of the students have some closed circuit TV instruction. Looking ahead, educators believe that the broadcast-type stations devoted to education might reach 200 within the next 15 years. A total of 272 channels have been allocated for educational purposes by the Federal Communications Commission.

One compelling reason for the growing use of ETV is the medium's well-known ability to hold the attention of an audience. A recent report by the Ford Foundation and the Fund for the Advancement of Education concluded:

> ". . . One of the most promising tools for attacking the educational problem has been television, the most powerful medium of communication yet devised by man . . . commercial television has done more to influence American culture in the past decade than any



Closed circuit educational television facilities provided by the Southern Bell & Independent Telephone Companies which will be available in South Carolina in September 1961.



Demonstration *of lessons broadcast from the Columbia, S. C. ETV studio over closed circuit was included in the National Education Association Convention at Atlantic City, N. J., in June. The program evoked much favorable comment from the educators there.*

other medium of communication. For better or for worse, it has also had a tremendous impact on the education of American children."

Equally important, in these times of swelling school enrollments and soaring educational costs, are the economic advantages which come with ETV. John L. Burns, president of the Radio Corporation of America, has stated:

"The rising cost of public schools, from $192 per pupil in 1950 to $330 today, has created almost insurmountable problems for many communities. Electronic teaching offers dramatic economies. The Southern Regional Education Board, covering some 300 colleges and universities in 16 states, reflected televised instruction costs of $2.80 per student per semester hour, compared with conventional costs of $12 to $18. At Hagerstown, Maryland, four teachers now provide music and art lessons which would have required 34 teachers before television."

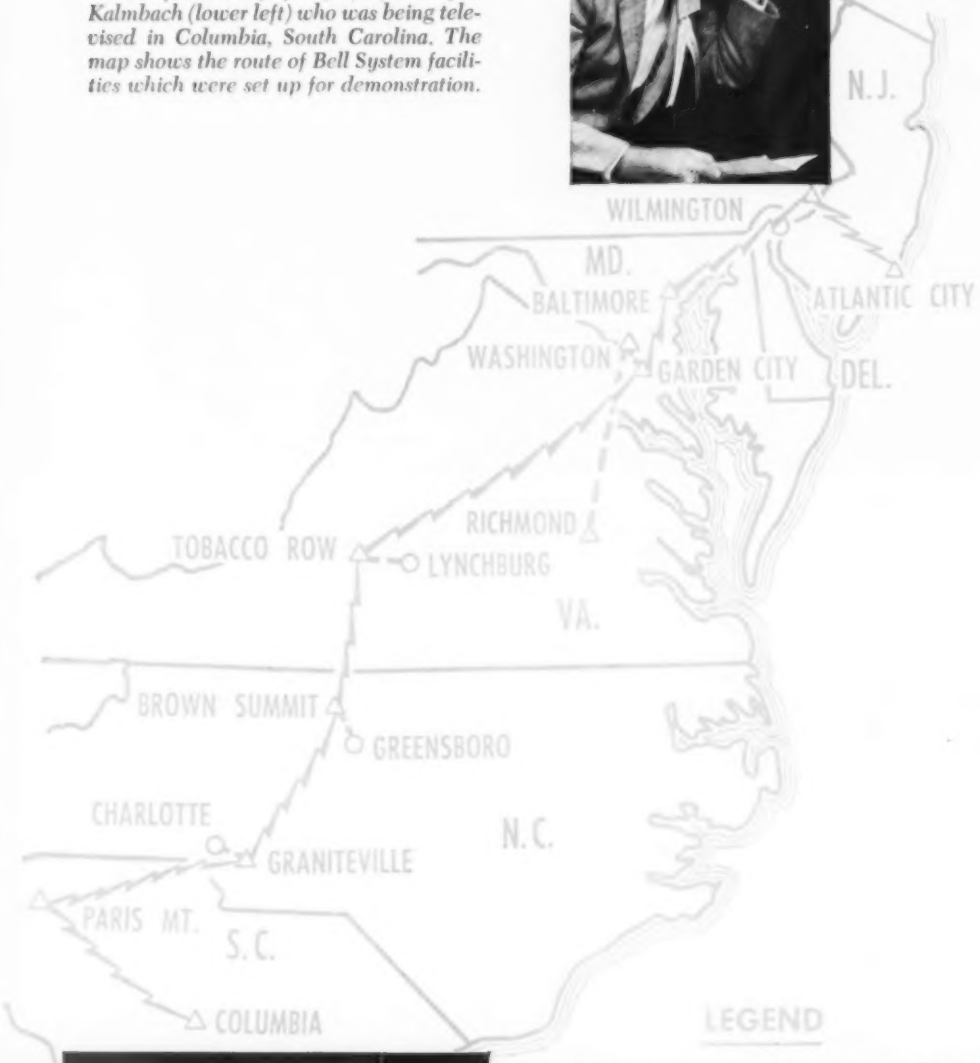
With a public education budget of almost $20 billion and growing with the expanding school population, which now equals about 47 million and which is estimated to reach 80 million by 1975, it is obvious that some action must be taken without delay to update educational tools.

The South Carolina Network

One of the most significant specific developments in the ETV field—and one to which Southern Bell contributed importantly—is the South Carolina network, involving over 400 miles of closed circuit facilities and serving 33 schools in 17 cities.

Regarding this experiment, *The New*

Two-way *closed circuit TV permitted viewers at Atlantic City NEA conference to ask questions (top right) of R. Lynn Kalmbach (lower left) who was being televised in Columbia, South Carolina. The map shows the route of Bell System facilities which were set up for demonstration.*



York Times quoted Dr. Alvin C. Eurich, vice president of the Ford Foundation, as saying on a visit to South Carolina that, "The eyes of every other state are focused upon South Carolina with more than casual interest. Future generations will be ever grateful for your pioneering work in making the best teachers available to all children."

Dr. William L. Bowden from the Southern Regional Education Board, which works closely with the Southern Governors' Conference, recently visited the South Carolina educational television system. "You have overwhelmed me," Dr. Bowden declared. "A miracle has been performed in South Carolina. My whole concept of the use of television will have to be substantially changed."

These enthusiastic conclusions were based largely on two key phases of the South Carolina program:

- The total application of the closed circuit system.
- Total use of video tape to prepare all lessons in advance and to preserve what may be desired for repeated use in future years.

Most other states, starting their experiments ahead of South Carolina, went naturally into the prevailing method of open circuit as used in commercial television. Where closed circuit had been used in other states, it had been largely within the confines of a single school or college.

South Carolina saw at once that open circuit TV would be limited to just one channel, meaning that there could be no more than 12 half-hour subjects a day, and that since there are 12 years of school, there could be an average of only one subject a day for each class. Also, the F.C.C. had allocated only four educational channels to South Carolina with an effective coverage at the best of only 20 to 25 miles.

First State-Wide Closed Circuit ETV

It was in the field of closed circuit transmission that South Carolina became a pathfinder, as evidenced by Dr. Bowden's and Dr. Eurich's comments. Closed circuit TV allows as many channels with as many subjects as might be desired, with excellent reception at every point.

When South Carolina began this experiment, there was no state-wide closed circuit educational network anywhere in the nation, and there were no cost figures. This was a challenge to Walter G. Edwards, vice president and general manager of Southern Bell in South Carolina, and to others in the Bell System. A force of engineering, maintenance and cost experts began a concentrated study, working day and night in areas which had not been explored. State Superintendent of Education Jesse T. Anderson and Dr. C. B. Seaborn of the state Department of Education cooperated in the preparation of special maps of every county, locating precisely every high school.

The result was that the legislature could be shown that every high school in the state could be served with three channels of closed circuit program material, offering 36 regular daily subjects, at a per pupil cost for the whole television project of only $12.67 a year, or a total of $3,800,000 a year.

The legislature was so impressed that it appropriated all that was asked for the 1960-61 school year—$643,000. This made it possible to carry an expansion of the experiment into 31 schools in 11 counties via closed circuit, and to include over 60 other schools

New Jersey *Bell installer-repairman sets up Bell equipment for ETV demonstration for Atlantic City NEA convention.*

which volunteered to receive parts of the program over the cooperating open circuit commercial stations.

New York's Pilot Project

Francis E. Almstead, a member of the New York State Education Department, and director of the Division of Educational Communications which is responsible for the state-wide supervision and development of television, radio and audio-visual aids, had this to say at a recent session of the House Interstate and Foreign Commerce Committee's Subcommittee on communications and power:

> "A pilot project sponsored by the State Education Department is a large cable transmission (closed circuit) installation in Cortland County. The cable connects schools in three school districts—City of Cortland, Truxton and Virgil. The State leases twenty-five miles of video-cable facilities and telephone line facilities used for pupil-to-teacher communication from the New York Telephone Company.
>
> "When we planned the project in 1957, we investigated the feasibility of using broadcast transmission, microlink systems and video cable. Further, we explored the economic difference between owning the connecting facilities and leasing the facilities from a common carrier company. First of all we decided to use cable because it offered the following advantages:
>
> - Guarantees a consistently high-quality signal at each building.
> - Requires no license of any kind for operation. Makes the equivalent of six broadcast channels available.
> - Gives an opportunity for experimentation on band or channel width leading to an improvement in the definition of televised pictures.
>
> "Second, we chose to lease cable facilities from the New York Telephone Company. This decision was made after careful thought was given to construction costs, management and cost of maintaining daily operation. We soon discovered that the department did not have adequate staff and technical competence for such an undertaking. We also realized that leasing of facilities would relieve the project and state of not only the construction problems, right-of-way problems and engineering, but also the problems associated with daily operation.
>
> "Our decisions to use cable and to lease from a common carrier company were wise indeed. Our

choices eliminated the hazards of technical failures due to inexperience or inadequate technical staff. "At the beginning of the project, school personnel wondered how they could possibly make full use of one channel. But as they gained experience and learned to use television in their classrooms they demanded more channels. I am sure that within the next year or two they will be using all six channels available on the cable. The experience of the use of a similar ETV system at Hagerstown, Maryland, supports my belief. It is important to observe at this point that demands of this magnitude by school districts for television precludes the sole use of broadcast transmission—there just are not enough air channels available in such a limited area. Broadcast channels should therefore be used to serve other interests in education."

The Bell System and TV

From the very earliest inception of commercial network broadcasting, both in the radio and TV fields, the Bell System has been intimately involved in providing the interexchange and intercity cable and radio facilities required for network operations. In the commercial TV field, specifically, we are now providing facilities to more than 380 commercial television stations. This involves, throughout the country, a total of about 84,000 channel miles of intercity video facilities.

In addition, the Telephone Company often provides cable and microwave systems to interconnect studios with transmitter towers and to pick up programs from public places. Our particular contribution in these fields is to provide facilities with uniform nationwide standards of transmission. Uniformity is essential to effective network operation where high technical quality and reliable full time service with an absolute minimum of interruption are demanded. We are ready and willing to adapt our experience to the particular needs of ETV.

Why We Are Qualified

The Bell System is especially qualified to do this kind of job. We have the research facilities and personnel in the Bell Laboratories as well as knowledge of construction and operation in the Long Lines Department of A. T. & T. The people in our Associated Companies are especially trained for this work. The technical and operational service requirements for educational television, in the broad sense, are similar to those for commercial TV. In short, any integrated network system such as television, be it educational or commercial, by its very nature requires the over-all system engineering and operation that is basic to our day-to-day job.

In many cases, any new construction required can make effective use of already existing plant such as poles, underground conduits, testing equipment and many other things.

Since the leasing of Telephone Company facilities minimizes the capital funds required to establish an effective system, greater use can be made of the funds available for education.

We Offer Quality

Finally, we know that the service we can provide will be of the highest quality. We recognize that there are others who can provide the same services and we are willing to compete with them on quality of service, reliability and

price. We know, too, that we can meet almost any reasonable service date. To emphasize this latter point, a firm order for the state-wide network in South Carolina was obtained only two months prior to the time the complete network consisting of about 400 miles of facilities was turned over to the customer.

The Bell System is now providing seven closed circuit educational television systems, ranging in size from the small Cortland, New York, plan with eight schools covering three school districts, the Hagerstown system serving 44 schools (which has been in service for five years) to the South Carolina state network which, beginning with the fall term, will serve 57 schools in 21 counties. Discussions are under way to expand the latter system to cover the entire state.

We also have outstanding bids on approximately 30 new systems, and throughout the System we are daily being asked to review, discuss, indeed price out ETV systems of various sizes. As a result we are adapting our experience to this new public need. Activities now under way at the Bell Telephone Laboratories blend in with an improved type of distribution system better adapted to meeting the requirements and desires of the educators than anything we have now.

We recognize that commercial video with its protective stand-by facilities, together with the need for split second switching to advertising material, is more demanding of manpower and telephone plant than educational video circuits. Recently, an A. T. & T. and Associated Company task force made a comprehensive review of the needs for educational television facilities. Its findings will guide the Operating Companies in establishing attractive rate structures throughout the various states.

The A. T. & T. Marketing Department is preparing a complete program, to be released later this year, which will include training aids, descriptive brochures, engineering considerations, operating and maintenance data and sales aids. It is our intent that the Bell System make its full contribution to the growth and development of this important educational service.

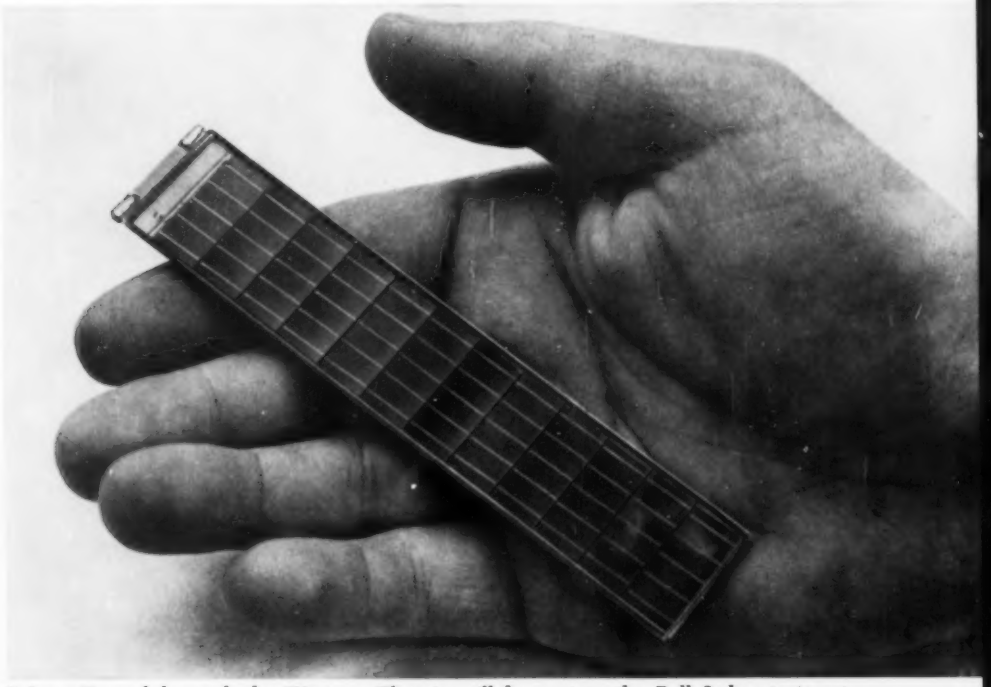
Bell Laboratories *has developments under way which promise an improved type of distribution system for educational TV.*

Making The Sun-Powered Satellite

Units of the Bell System are well along in their preparations for the first experimental active communications satellite. They will have it ready for launching early next year—at no cost to the taxpayer

THE PICTURES on these pages are the first to show the manufacture of solar cells, essential components of the Bell System's new satellite. It will use the power of the sun to relay telephone calls and TV programs from continent to continent. These photographs were taken at Western Electric's Allentown (Pa.) Works, where the solar cells, along with various types of transistors and diodes, are being produced for satellite use.

The solar cell is a semiconductor device developed by Bell Laboratories, inventor of the Solar Battery, for the conversion of sunlight energy



Solar cell *module made by Western Electric will be sent to the Bell Laboratories at Murray Hill to be mounted on the "skin" of experimental communications satellite.*

into usable electric energy. Mounted on a satellite's outer skin, these cells use sunlight to charge the inside storage batteries which power the repeater satellite's radio transmitter and receiver. The cells are slices of silicon crystal about three times the thickness of a human hair. They are impregnated with substances which give them their capacity for generating electricity when exposed to light.

Other units of the Bell System are also working toward the goal of an early launching of the satellite. The Bell Laboratories, which developed the proposed space communications system, is now making repeater satellite models. The Long Lines Department of A. T. & T. plans to complete the first ground station for space communications early next year. Located near Rumford, Maine, it will include the world's largest horn antenna for transmitting signals to and receiving them from satellites. As the *BTM* went to press, a cooperative agreement was concluded between A. T. & T. and the National Aeronautics and Space Administration for rockets and associated facilities to launch experimental communication satellites at the Bell System's expense.

The Bell System has proposed, after this experiment, a system using a number of active satellites which would encircle the earth at an altitude of about 7,000 miles. Such a system would make use of known communi-

Special suction *apparatus is used to handle delicate units prior to placement in evaporation machines.*

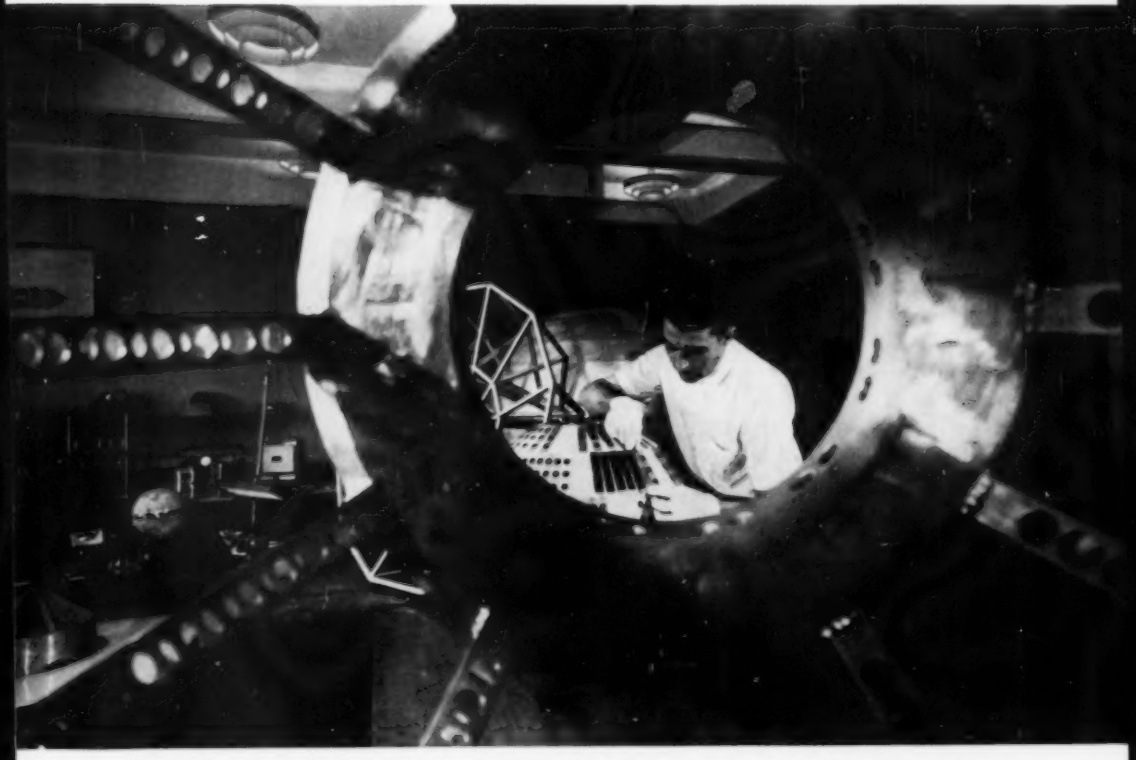
Slices *of silicon crystal for solar cells are shown being given an air blast of aluminum oxide powder.*

Solar cell slices *come from diffusion furnace in which they get characteristics for converting sunlight.*

cations techniques and could be begun at once with excellent prospects for success and without government subsidy. It would be an important step toward a much-needed universal communications system and would put the United States well in the lead in international space communications for peaceful purposes.

This system would be a natural extension of networks used in providing service today. The proposal is in line with the long-standing national policy that entrusts U. S. domestic and overseas communications to private enterprise operating under government regulation.

The proposed satellite system would be shared with all U. S. international communications common carriers either through lease or ownership arrangements. Foreign ground terminals would be owned by foreign communications agencies. Such a system would not be dominated by A. T. & T. Our sole interest is in the earliest practicable establishment of a world-wide commercial satellite system useful to all international communications carriers here and abroad.



View *through the framework of a satellite model at Murray Hill shows solar cell modules being mounted on the outer surface of an experimental communications satellite.*

Here is a prominent doctor's enthusiastic report on how telephone engineers are helping to advance medical research through the volunteer SAVE program

Telephone Engineers' Contribution to Medical Research

Dr. George V. LeRoy, *Professor of Medicine*
UNIVERSITY OF CHICAGO

SEVERAL YEARS AGO, a small group of Illinois Bell telephone engineers listened intently as two University of Chicago medical research doctors described a problem they faced: How to get an accurate count of a person's heartbeats over an extended period of time without interfering with his normal activities of work, play and sleep.

This was not a new problem. For many years, physicians have wondered about the relationship of pulse rates to circulatory diseases, smoking, body weight, occupational activities, athletics, and so on.

"Can you develop an instrument to do this job?" was the doctors' challenge to these engineers.

The telephone engineers who accepted this challenge are members of a unique organization called SAVE—for "Service Activities of Volunteer Engineers." Their success in developing the "Cumulative Heartbeat Recorder" will be described later on.

The idea for SAVE originated with Illinois Bell President William V. Kahler in 1957. At that time Mr. Kahler, who also is a trustee of the University of Chicago, had recently been a guest at our annual Open House, where some

Volunteer *SAVE engineers such as Leroy J. Ryan, Illinois Bell (below) do much of the work in their home workshops.*

of the research projects conducted by members of our staff were on display.

A Need—And An Opportunity

He recognized a need and saw an opportunity for engineers to make valuable contributions to medical research. Mr. Kahler knew that telephone engineers had specialized knowledge and research ability in electronics, sound transmission, data processing and communications theory.

A medical researcher's job is to seek information about the human body. His problem is *how* to get it! Because telephone engineers are trained in communications, which means transporting information, there seemed to be a close link between the needs of our medical researchers and the ability of the telephone engineers to satisfy these needs.

From our standpoint as medical scientists, the idea of cooperative research with telephone engineers was a happy one. Advance on the frontiers of biological science has sometimes been delayed because theory and speculation has progressed faster and farther than the equipment with which the medical researcher is familiar.

Although many doctors are skillful instrument-makers, it does not seem to me that gadgeteering makes the fullest use of their specialized knowledge and backgrounds. Obviously no doctor can possibly know as much about recent developments in other areas of science and technology as the men who specialize in these fields.

A meeting was held in 1957 between doctors on our research staff and telephone engineers to explore the possibility of cooperative research projects. Some 45 engineers volunteered to work, either as individuals or in teams, with people from the University's medical research staff on selected instrument problems. The work was to be done on the engineers' own time and at their own convenience, and mainly in home workshops.

At this meeting, enthusiasm built up as both groups discussed the SAVE idea.

The doctors—who need increasingly complex and sophisticated research instruments—were enthusiastic about the prospect of getting help from a group of industrial engineers. The engineers, in turn, saw SAVE not only as a worthwhile public service, but also as a medium which provided an outlet for

Medical equipment *developed by SAVE volunteers is examined by, left to right, Dr. D. A. Rowley, University of Chicago, L. J. Ryan, Illinois Bell engineer, William V. Kahler, Illinois Bell president and originator of SAVE, L. L. Swan, Illinois Bell engineer.*

personal interest in scientific matters and helped to expand their own professional horizons.

A Statement of Purpose

The Illinois Bell engineers who organized the first SAVE group, drafted a formal constitution. It states that the purpose of SAVE shall be to "provide technical and engineering assistance to the medical research field as a service to humanity . . . to establish a close rapport between the engineering profession and that of modern medical research . . . and to help the engineer or technician to acquire the personal satisfaction of being a part of an active group in a fascinating venture in close collaboration with interesting and accomplished associates."

As one SAVE engineer put it, "SAVE provides a new and stimulating type of research and development work which an engineer may not find in his normal duties. Health problems are close to each of us and to our loved ones, and our enthusiasm is spurred by our interests in doing something for society."

Most suggestions for SAVE projects already done by the Illinois Bell organization have originated at the University of Chicago's School of Medicine. Each project is screened to see how it fits into the University's long-range research objectives and is checked against the following ground rules:

- It must be confined to the area of electronics, sound transmission, data transmission and processing, communications theory, or miniaturization.
- The precise medical research problem involved must be fully outlined and requirements written out in sufficient detail to permit complete understanding.
- Funds from University sources must be available for apparatus and materials that may be needed by engineers to bring the project from the idea stage to the working model stage.
- The doctor shall have searched the literature in the medical field to insure that his instrumentation problem has not already been solved.

In its four years of operation, SAVE engineers have made a number of significant contributions to medical research and more are on the way. SAVE devices have been well received at International Medical Electronics conventions where new devices are demonstrated and released.

Thus far, the Illinois Bell SAVE organization has a solid record of

Discussions *with doctors help acquaint SAVE volunteers with medical profession's needs. Here SAVE President L. L. Swan discusses new devices needed in open-heart surgery.*

achievement. Of 32 projects undertaken, 12 have been completed, two are almost completed, and the balance are in various stages of development.

Requests for help from SAVE have been received from other schools and research organizations as the SAVE story has become known. Among these are the medical schools at the Universities of Illinois, Minnesota, and Vermont, and from members of the American Medical Association, and the Chicago Heart Association.

The Heartbeat Recorder

One of the first projects undertaken by SAVE engineers was the request by Drs. Donald A. Rowley and Seymour Glagov for the heartbeat recorder that was mentioned at the beginning of this article.

Four Illinois Bell engineers, L. J. Ryan, L. E. Harrington, E. A. Ewers and L. J. Murphy, volunteered to see what could be developed. Working in their home workshops, and on their own time, they drew up a basic design. Then they called upon Watson B. McCreary, another Illinois Bell employee whose hobby was watchmaking, to help put the mechanism together in a miniature "package."

The device, called the "Cumulative Heartbeat Recorder," was assembled from a $50 lady's wristwatch, silver electrodes, transistors, midget mercury batteries, and a coil magnet.

This three-ounce recorder can be worn over a person's chest 24 hours a day, if desired. The electrodes pick up the tiny electrical impulses generated by each heartbeat which are then amplified by the transistors. The electrical impulses travel through a magnet, creating enough power to move a lever controlling the watch's escapement mechanism. Each heartbeat is represented by the tick of a watch. And since there are five ticks to the second, each five beats of the heart show up on the face of the watch as one second. So, one minute is the measure of 300 beats, and an hour of 18,000 beats. The face of the watch becomes not a time-teller but a meter that records heartbeats.

The device is the first which medical science has had which is small enough and rugged enough to record heartbeats over a long period and during normal everyday activity. To record

Tiny *cumulative heartbeat recorder is seen in left hand of W. B. McCreary of Illinois Bell. It can be worn during a full day of normal activity. Electrocardiogram machine below shows comparative size.*

the heartbeat over 24 hours using an electrocardiograph machine would take a mile and a half of cardiograph paper, and the individual would have to lie still for the entire time.

Dr. Rowley has said of this device: "The efforts of these engineers represents the equivalent of at least a $30,000 contribution to medical research . . . but their patience, understanding and willingness to solve our toughest problems are invaluable . . ."

A Teaching Machine

Another completed SAVE project is a device called a Cytodiagnostic Test Apparatus developed by another Illinois Bell engineer, A. E. Petrie. Dr. George L. Wied, assistant professor of obstetrics and gynecology at the University, suggested that SAVE develop some way of training technicians to recognize cancerous human cells. The equipment, which can be contained in a suitcase, is used to teach technicians and students to recognize some 24 factors that determine if a cell under a microscope is cancerous. A punched card is put in the device for each specimen slide. The student studies the slide, then by pressing keys tells the machine his diagnosis. The machine then indicates whether the student's diagnosis was correct or not.

The cytology teaching machine can present the same problems over and over again. In effect, it represents the application of automation to a teaching situation, and it is helping ease the terrific problem caused by a shortage of technicians. For Dr. Wied, it means more time to devote to patients while still being able to train his technicians.

Author *of this article, Dr. George V. LeRoy, left examines cancer-detection machine designed by A. E. Petrie of SAVE right. It helps teach lab technicians to identify cancer cells.*

Electronic Stethoscope

Development of an Electronic Stethoscope is still another SAVE achievement. During surgery, doctors often find it difficult to personally monitor the action of the patient's pulse. A three-man team of SAVE engineers developed an electronic stethoscope which will blink a light or operate a "beeper" at the same rate as the heartbeat. In effect, this device is a "heartbeat metronome."

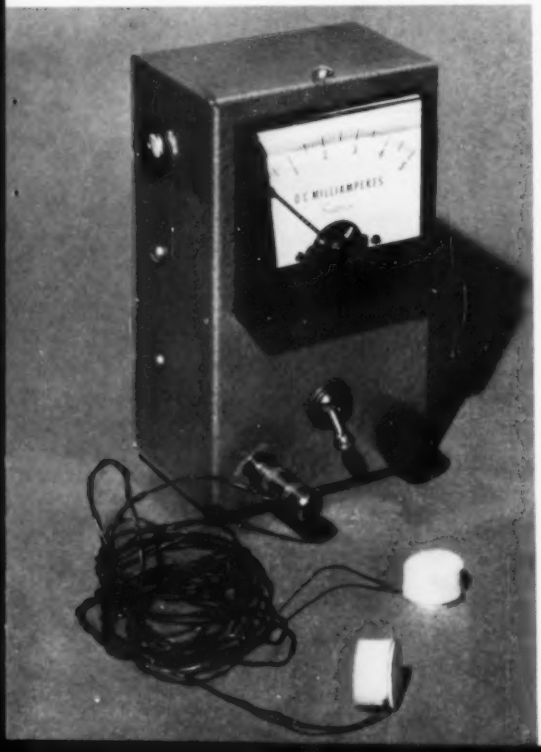
Periodically, our doctors and SAVE members meet to discuss the status of current projects and to develop future ones. At these meetings, the doctors explain their instrumentation problems to the engineers, and point out what solution of the problem could mean to medical research.

SAVE engineers then volunteer to work on the various projects, choosing those in areas of particular interest to them. They are free to work on one or several projects, either alone or as a member of a team.

There are frequent contacts between individuals or teams and the doctors to keep a project moving toward completion. However, in order to save time for both the doctors and engineers, a three-man liaison committee has been set up to keep contacts to a minimum.

Circuitry and other information concerning instruments developed by SAVE are made readily available without charge for general use in the medical field. Requests for information about SAVE projects have come from individual doctors and medical researchers, universities, colleges, hospitals and other organizations, both in the United States and abroad. Various military groups as well as other governmental agencies have written SAVE for information or help.

Electronic Stethoscope *developed by SAVE is a valuable aid during surgery.*



SAVE Is Growing

The SAVE idea is spreading to other parts of the country. Organizations have been formed with engineers from a number of Bell System companies, such as Ohio Bell, Pacific Telephone and Telegraph, Western Electric, and the Bell Telephone Laboratories.

Mr. Kahler has said that "cooperative research between dedicated and competent medical research doctors and telephone engineers is an outstanding example of public service. The developments that result are the tools that might be responsible for breakthroughs in still unknown fields of biological science."

As one who is deeply interested in advancing medical research, I have great hopes for this new approach to

medical research. It can permit our doctors and scientists to take advantage of a large store of professional knowledge and creative ability, the existence of which was either unknown to us, or to which we have had only limited access.

Medical researchers are usually solo investigators, and I believe they can learn a great deal about the technique of problem-solving from industrially-trained engineers, who frequently deal with new problems on a team basis.

Organizations like SAVE can help bring a greater degree of automation to the medical field, and thus help free highly skilled people from as much routine work as possible.

I sincerely hope that more SAVE groups will come into being, not only throughout the Bell System, but among other engineering groups as well. If this can be done, their efforts will represent a truly major contribution of service to mankind in a field which is dedicated toward that goal.

First step *in getting a SAVE project under way is seen here as two University of Chicago research doctors outline an instrumentation problem to a group of SAVE engineers.*

If we, as a nation, attack the complex problems now emerging with wisdom and courage, the country's economic future can be bright indeed

A New Look at The 1960's

John C. Swartley, *Chief Statistician*
COMPTROLLERS DEPARTMENT, A. T. & T. CO.

To BEGIN an examination of our economic future on relatively solid ground, the best place to start is with some of the changes that have been observable in the U. S. population during the last decade or two.

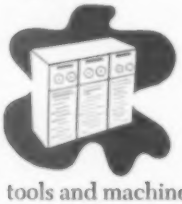
Valuable information concerning the population growth—both national and state—is now available from the 1960 Census. The population of our nation increased by some 28 million people, or 18½ per cent, in the last decade. Florida, Nevada, Alaska and Arizona all increased over 70 per cent in the last decade but the population of Mississippi, Arkansas, West Virginia and the District of Columbia declined during this period. The variation in rates of migration accounted for most of the differences in these rates of population growth.

According to the Bureau of the Census, migrants came largely from the Deep South, the Great Plains, the Appalachians, and northern New England; they moved to the mid-Atlantic Seaboard, the Pacific Coast, the Southwest, Florida, Alaska, and to a small extent, the Great Lakes area. There was a continuing trend from rural to urban areas, particularly to the suburbs of large cities. However, many of the largest cities themselves actually declined in population between 1950 and 1960. Although there were exceptions, the growth trends in the last ten years continued the pattern which characterized the decade of the Nineteen-forties.

This brief glance at the last ten years gives us some idea of what we might expect in the Sixties. By 1970, our population should be about 215 million people. During these ten years the children born since World War II will be seeking jobs in ever-increasing

numbers. They will change the age mix of our working forces in dramatic fashion. For instance, the age group 15 to 24 will increase nearly 50 per cent by 1970, while the 25 to 34-year olds will increase only ten per cent and the 35 to 54 group only about five. We will have to develop employment opportunities for the young, relatively unskilled additional workers, and to provide these additional job opportunities we must have economic growth—an increase in the economy's output. Not only must we have growth, but, if our standard of living is to continue to rise, production must increase faster than our population.

Better Tools



One of the more obvious means of increasing the productive efficiency of our economy is to provide better tools and machines. In order to provide them for the approximately 13 million additional workers expected in the next decade, we will need an even higher rate of capital investment than in the past decade.

More is required, however, than just the replacement of old machines and the addition of new ones. We are going to need new ideas, new products, and improved technical knowledge. Because of these needs, research and development will be an increasingly important factor. As recently as 1950, spending for research and development amounted to $3 billion. Ten years later, in 1960, outlays of $13 billion were recorded, and this figure could double in the next ten years.

Education

Another major requirement for increasing our national productive efficiency is better general and technical education. Workers in industry will require a greater degree of technical knowledge to cope with the problems of an era of increased mechanization. To keep pace with the increasing complexities of our times, we must create better understanding of domestic and foreign policy and the complexities of business-government relationships. Our educational system must have the necessary physical plant —elementary and high schools, trade and technical schools, colleges and universities—to handle the demands placed on them. Most important, the quality of our teachers must be such that the coming generation will be adequately prepared to deal with the problems its age will bring.

Free Enterprise

Let us consider what is needed to provide a favorable atmosphere for the free enterprise system to maximize our economic growth. In the first place, tax reform is clearly indicated. The highly graduated personal income tax has a top bracket of 91 per cent. This bracket and the other brackets above 50 per cent produce relatively small amounts of tax revenue. They unnecessarily restrict initiative and should be modified so that the top bracket is no more than 50 per cent. This would make the individual's share in each bracket at least equal to the Government's share in the division of the rewards of individual effort.

Another important and equally desirable step is the modification of the depreciation allowances for tax purposes. In addition to allowing for a

shorter life, taxpayers should be allowed depreciation based upon the original cost of their property, with the dollar amounts allowed being adjusted to reflect changes in the purchasing power of the dollar.

Still another factor is that the financial health of regulated industry should be encouraged by regulatory authorities. This segment of industry, which represents over 20 per cent of all capital invested by corporations, should be permitted earnings in reasonable relation to other successful businesses. Earnings in this range are needed in order to give good service, to improve it, and to attract capital needed for expansion.

It is also important to both our domestic economy and foreign trade that wage costs not rise at a rate which will necessitate general price increases. The benefits of productivity must be shared with the investors and the consumers, rather than going primarily to wages as they have in the postwar period.

Unless some of these benefits flow to profits, investment capital will be discouraged. Without adequate investment, the very source of productivity gains will disappear. There is a real need to improve public recognition of the role of profits in providing impetus to our economy. Business leaders should apologize if they *fail* to run a profitable business, but not when they are successful.

Such steps will have a stimulating effect on the private sector of our economy and offer real hope for a solution to our unemployment problem through the creation of new jobs. Some phases of the unemployment problem, however, are not likely to yield to any single solution. Depressed area unemployment, for instance, is likely to be solved only by a concentrated attack on the specific problem. This will include some means of retraining, coupled with the encouragement of workers to move to localities where their skills are more in demand.

These are some of the problems that face us in the domestic field. We also have some major difficulties in the international area, including the matter of our balance of payments (see "The Gold Problem", *B.T.M. Winter* 1960-61), and the overriding problem of attaining workable world peace.

World Peace

World trade and domestic economic growth can be considered only on the assumption of a world at peace. Unless some sort of peace is sustainable, based on an uneasy balance of power if necessary, consideration of our economic future is academic.

Perhaps the one fatal mistake we could make is to fail to remain strong. If we dissipate our energies, if we fail to recognize our responsibilities, if we accept false ideals, we will certainly fail ourselves. Fortunately, our record is good. As a nation, we have always been able to rise to the occasion, and there is no real reason to believe we will do otherwise in these times. The strides we have taken are many and they range from essential rejection of isolationism as the basis of our foreign policy to increased stabilization of our domestic economy against the violent swings of earlier decades.

Growth

We are presently in what should be a recovery phase of considerable strength. While there is still no clear

picture as to the length of the expansion phase, Gross National Product has already reached new high ground, and the FRB index of industrial production is approaching a new high. Retail sales have improved since earlier this year, and the signs suggest this strength will continue. By all indications available now, 1962 should be a good business year.

Beyond 1962, the picture is less in focus. What will happen to our economy in the years ahead will depend to a large degree on our political and economic wisdom in solving the problems that I have briefly touched upon. There is nothing inevitable in growth, business expansion or progress. They must be created.

How fast should we grow?

Some advisers have arbitrarily set goals for future economic growth — goals of five or even six per cent per year even though our long-term rate has averaged three to three-and-a-half per year. There has been great variation in year-to-year rates of growth. Our experience is sufficient to warn us that unusually high rates of growth cannot be attained except at the price of sharp inflation or regimentation. The rate at which our economy should grow cannot, and should not, be decided and directed by a few centrally located individuals. It should be determined by the consensus of consumers and producers across the nation. We should promote healthy growth that is solid and widespread, that is sustainable, and that does not ask too high a price in restriction of personal freedom. Most important, growth must be in the kinds of things people want and are willing to pay for. Moreover, if we are to have any acceleration in growth, it must necessarily come mainly in the private sector which contributes the bulk of our national output.

We can feel reasonably certain that we are not likely to experience again a depression of the kind that dominated the decade of the 1930's. We have learned a great deal about the operation of our economy since that time, and the combination of factors culminating in that disastrous period are unlikely to be present again. We have protective devices to insure us against a failure of our banking system; we have a government sector sufficiently flexible to provide some protection through variations in spending. On the other hand, a future without some fluctuation seems a very unlikely prospect. We must not forget that during the last decade and a half, when all of these protective devices were operating, we have had four short and relatively mild recessions.

Favorable Trends

In general, however, because I believe in the superiority of our economic system over any other yet conceived, my personal opinion is that our future is bright. We have some long-term trends that are quite favorable. The average length of the workweek has been declining for 50 years, but during the last decade the rate of decline has slowed. It is reasonable to suppose that further declines in the workweek in the immediate years ahead will be small. While this is a removal of a negative factor rather than the addition of a positive one, stability in the

workweek will tend to act in the direction of aiding future growth.

Per capita Gross National Product —a measure of changes in our living standard—has a strong upward trend. While changes in this measure reflect both changes in GNP and changes in population, there is reason to hope that future increases will continue at about the postwar rate.

Total personal income has not only increased with increasing Gross National Product, it has demonstrated a healthy long-term tendency to be spread ever more widely. This has contributed importantly to the development of mass markets and continuation of this trend is a very favorable element of our long-term projections.

As a specific example, we find a marked relationship between family income and demands for telephone service. Wider distribution of income throughout our population means greater demand for minimum service, more long-distance messages, and a larger market for extensions and other auxiliary equipment.

"Younger" Market

The constantly changing age level of this mass market will be accompanied by changing demands on all business. In the coming decade, with a significantly younger consumer market due to a 30 per cent increase in people under 30, we can expect increased emphasis in products desired by teenagers and those which normally accompany the formation of new families. For example, small home appliances, school supplies and leisure activity equipment may expand more rapidly than the average. Home ownership, sales of expensive durable goods and possessions normally associated with the middle-age groups of 35-55 are likely to expand at a lesser rate. Confusing this mixed sales picture, however, are the possibilities of less favorable employment conditions which could prevail by virtue of the large number of additional workers seeking jobs.

It seems reasonable to conclude that the long-term growth of Gross National Product will continue at about the same rate as in recent years. I see no reason to believe that we have suddenly acquired new wisdom that will enable us to sustain unusually high growth rates in the future. Nor do I think it is likely that we will be any more unwise in the future than we have been in the past.

The labor force, population and GNP per capita are quite likely to increase around 20 per cent each by 1970. The composite effect of the growth in population and in GNP per capita is that total GNP is likely to increase roughly 40 per cent by 1970, and, in 1959 dollars, reach a level of about $700 billion.

This is substantial growth and should not be considered inadequate because it falls short of certain preconceived higher levels. Growth of this amount will reflect a strong, virile economy responding to the real needs of a growing nation. It is realistic growth and is obtainable by means well within our grasp.

Here are the first results of a Bell System effort to help the brokerage business serve the twelve and a half million American investors better than ever before

"Make It Small . . . Make It Fast . . . Make It Accurate . . ."

Lincoln R. Ward, *Major Account Sales Supervisor*
MARKETING DEPARTMENT, A. T. & T. CO.

THE INVESTORS of America . . . the Los Angeles housewife . . . the Dallas mechanic . . . the Milwaukee doctor . . . the Kansas wheat farmer . . . the Detroit production worker and the Walla Walla school teacher . . . by the tens and by the thousands telephone their brokers to buy and sell stocks, bonds and commodities. Through the lifeline of communications, about $1 *billion* of worth is traded *daily*. All in all, it is the mightiest tide of economic power in the world today.

Brokers are the catalysts of this awesome financial activity, changing their customer requests into trading actions on the floors of the nation's 17 securities and 16 commodities exchanges. And brokers literally live "on the wires." Where the average American uses the telephone 500 times a year, a busy broker may easily match this number of calls in a couple of days.

In perhaps no other business is the split second so important. In fact, there's a saying in financial circles—undoubtedly influenced by today's TV diet—"make the right move half a blink too late and you're deader than a nearsighted gunfighter."

Day in and day out, Bell System communications networks trigger the thousands upon thousands of conversations and messages that form the very heartbeat of American financial life—and aid the broker in his race against time. Now, we have equipment and services to offer which will do a better communications job for him than was ever possible in the past.

Genesis of a Study

In 1957-58 when the Bell System saw daylight after the unprecedented post-

war demand for basic telephone service, the time was ripe to search out other important uses for communications; other ways to help customers. A. T. & T. Headquarters people donned long-range glasses and proposed, among other measures, a series of basic industry studies. The objectives:

- To help specific industries improve their operations through the more efficient use of communications.
- To initiate the development of new communications services and equipment which would give greater value to our customers.
- To train Bell System salesmen so that they could serve our customers more effectively.

Since communications are the "lifeline" of the brokerage business, it was only logical that it should be placed high on the list of those to be studied.

Getting The Facts

A New York Telephone Company study team, headed by Frank Siedenburg (fresh from a similar "lifeline" study of the airlines) with close cooperation from the Long Lines Depart-

Communications *are the "lifeline" of the broker in his daily job. Now, as a result of a recent Bell System study of the communications requirements of the brokerage business today, we are offering the broker "tailor-made" services specially adapted to his needs.*

Data *gathered in the Bell System's brokerage communications survey is analyzed by Frank C. Siedenberg, sales promotion supervisor of the New York Company.*

ment—the long-distance service arm of A. T. & T.—moved into action.

But how do you study a business with thousands of offices throughout the country and with millions of customers? It was decided that the best way to begin was to make a large-scale survey of the brokerage business. The study team conducted hundreds of personal interviews and sent thousands of detailed questionnaires throughout the brokerage community. From this they amassed a literal encyclopedia of facts about the communications needs of the brokerage business and areas where the Bell System could help. In digging into this material, it quickly became apparent that besides speed and accuracy brokerage offices needed equipment that would take up a minimum of space. In other words, they asked us to "make it small, make it fast, make it accurate."

From Mining to Refining

Stage two of the effort was to convert the raw material of the study into a "package" of information, equipment and services designed to meet the mutual interests of the brokerage business, the Bell System—and, in the final analysis, the investing public. A special marketing team at New York Telephone Company headquarters, guided by Eldon Hanes and spearheaded by Judson Ahrens, took over this "refining" process. Once again A. T. & T. Long Lines people provided an intercity boost to the effort.

Results

Here are high spots of the refining process aimed at meeting the broker request "make it small, make it fast, make it accurate."

- New Call Director order equipment which provides traders with modern and efficient access to several hundred telephone lines. Using push-button action, each 30-line unit requires less than half the table-top space of former equipment.
- Call Director telephone to bridge the gap between six button telephones and the new order equipment. Fills the needs of commodity traders and some "over-the-counter" operations.
- New wall-mount "broker phone" —a streamlined, double-handset

design, tailor-made for tight-space needs on the floor of exchanges.

- Automatic dialers to save trader dialing time and improve accuracy on repetitive calls—particularly helpful in syndicate handling of stock and bond issues.
- "Skin-tight" teletypewriter – fits into tight spots on exchange floors and in broker wire rooms—same high-quality performance as conventional equipment.
- A range of new teletypewriter systems such as FINAC and the Data Distribution System, to give added automation, accuracy and speed on interoffice broker teletypewriter messages.
- *Men, Money and Markets,* a training manual on broker operations and communications; for Bell System sales people; equally helpful in training broker personnel.
- Goals and developments for the future, ranging from miniaturized telephones to data transmission concepts.

Going To Market

Next, the marketing effort was mobilized. At this stage, Engineering, Laboratory, Rate, Production, Plant and Sales functions needed scrutiny.

What sort of production schedule could be met on the "skin tight" 28-teletypewriter? When will manufacturing drawings be furnished to Western Electric for the new order equipment? What is a marketable and profitable price for the "broker phone"? What sort of sales aids will the salesman need? How about the availability of writers—art work—printing time? When and how should the marketing program be announced? To whom?

These and countless other questions

Broker's booths *crammed with telephones are an indication of the need for fast, accurate communications. In order to save space, equipment must be as compact as possible, too.*

were the daily fare of the planning effort. At this stage, the "195" Sales Staff came more and more heavily into play. Joseph Silvestri transferred from the New York Telephone Company to A. T. & T.'s Major Account Sales Section and became an around-the-clock companion of the New York Company-Long Lines team.

Action

In rapid-fire order the plan for the marketing "package" was whipped into shape and reviewed with key people in the brokerage business for comment. Sales material was written and printed. All Bell Companies were alerted to the marketing plan and, where appropriate, they designated industry sales specialists to handle the package.

A pilot presentation of the sales training material, *Men, Money and Markets* and a brochure *Modern Communications for the Broker* was given to New York Telephone's salesmen assigned to brokers. The entire package was sent to all the Bell Companies. Bell Companies established target dates for training their salesmen, began market selection of their brokerage customers. On December 16, 1960, a formal presentation was given to offi-

Conventional *telephone order equipment used in broker's trading room. Console in foreground provides 90 lines to other brokers in the "Street." Eldon Hanes of the New York Company discusses need for new features to keep pace with growing trading activity.*

cials of the Association of Stock Exchange Firms. By February the Bell Companies were presenting the package to their individual broker customers. By June we were ready to assess the early results.

The Follow Through

At this point, all those associated with the many months of effort might well have expected that vacation time had come.

This was hardly the case.

Joseph Silvestri, for example, found himself torn between printing and distribution problems and airline schedules. In a few short weeks, he appeared in Boston, New York, Columbus, New Haven, Philadelphia, Los Angeles, Newark and San Francisco to assist with the training of salesmen or to discuss individual Telephone Company plans and problems.

Then came the phone calls—"send me 100 more *Men, Money and Markets* books." "We're running into delays on order equipment." "We'd like to present the story to banking officials." In fact, for a while, it looked as if he and Eldon Hanes' New York Company Marketing Staff would come close to matching the broker

Compact new *Call Director order equipment provides fast push-button connection and takes less than half the space of conventional equipment for the same number of lines. The new equipment comes in flexible modules which can provide from 30 to 240 lines.*

volume of daily phone calls!

During this period, constant telephone spot-checks were made to keep tabs on problems and progress noted by Bell salesmen.

Some Results

To be effective, a marketing package must meet its objectives of mutual benefit to the customer and to the Bell System. How well did we do in the brokerage effort? While time alone will be the final judge, here's a look at the score in just four months' time:

New revenue created for the Bell System—$500,000. But this figure alone fails to show relativity. Here's what New Jersey Bell did with the package. Six out of every ten customer presentations resulted in a sale. (Compared with a normal three out of ten.) Annual revenue per sale amounted to $1,300 (compared with $271 on similar non-broker sales).

And New Jersey was not alone. The Los Angeles Area of Pacific Telephone completed 40 per cent of their planned broker presentations by June first. Here's their report: "The presentation is being enthusiastically received and is developing more appreciation of our desire and ability to be of assistance. In over two thirds of our presentations to customers, we have been able to sell additional services."

In Michigan—"Of the first 12 offices contacted, five placed orders for nearly $25,000 in new services and orders are pending for several others."

Wisconsin—"The package has proved a valuable door-opener to broker top management."

Mountain States — "Ratio of Sales to contacts at 65 per cent; revenue per sale $1,600; program has been exceptionally well received by the brokers."

With evidence of this type, could the program be stamped a success? Not without taking the customer view into account. If our objective were only to gain revenue and not deliver plus values to the customer, we would have failed before we started.

Here's what our customers say:

New York Stock Exchange:

"This is one of the finest jobs I've ever seen and should do a tremendous job for you in the brokerage industry."

Pacific Coast Exchange:

"An excellent report—one which should prove to be very useful to members of the industry."

Henry Franc and Company:

"In the past I've never been very confident that the Telephone Company was interested or able to keep up with our communications problems, but I can see you've done a great deal to change my mind."

Capital Investment Company:

"Report so interesting and informative that I have made it required reading for all employees."

White, Weld and Company:

"Glad to see you're aware of the growth potential of our industry and are doing something to help us with it."

United States Trust Company:

"I'd like additional copies for all of our officers and Board members."

Irving Trust Company:

"This is wonderful—done excellently; think the book *Men, Money* and *Markets* would be terrific for colleges and universities."

(Incidentally, Public Relations groups in the Bell Companies are handling this distribution.)

In the final analysis, broker enthusiasm over the package and willingness to buy improved communications

service to do a better job of serving their customers is our best and only long-range means of assessing the worth of the effort.

At this date, Frank Siedenberg, Eldon Hanes and Joseph Silvestri and the many others who with them are responsible for the job, rightfully should feel that they were "on target" all the way.

Epilogue

Major account marketing efforts such as these are not an end product, but rather a start. Once begun, they require continuing attention and action to grow with the changing needs of the business or industry.

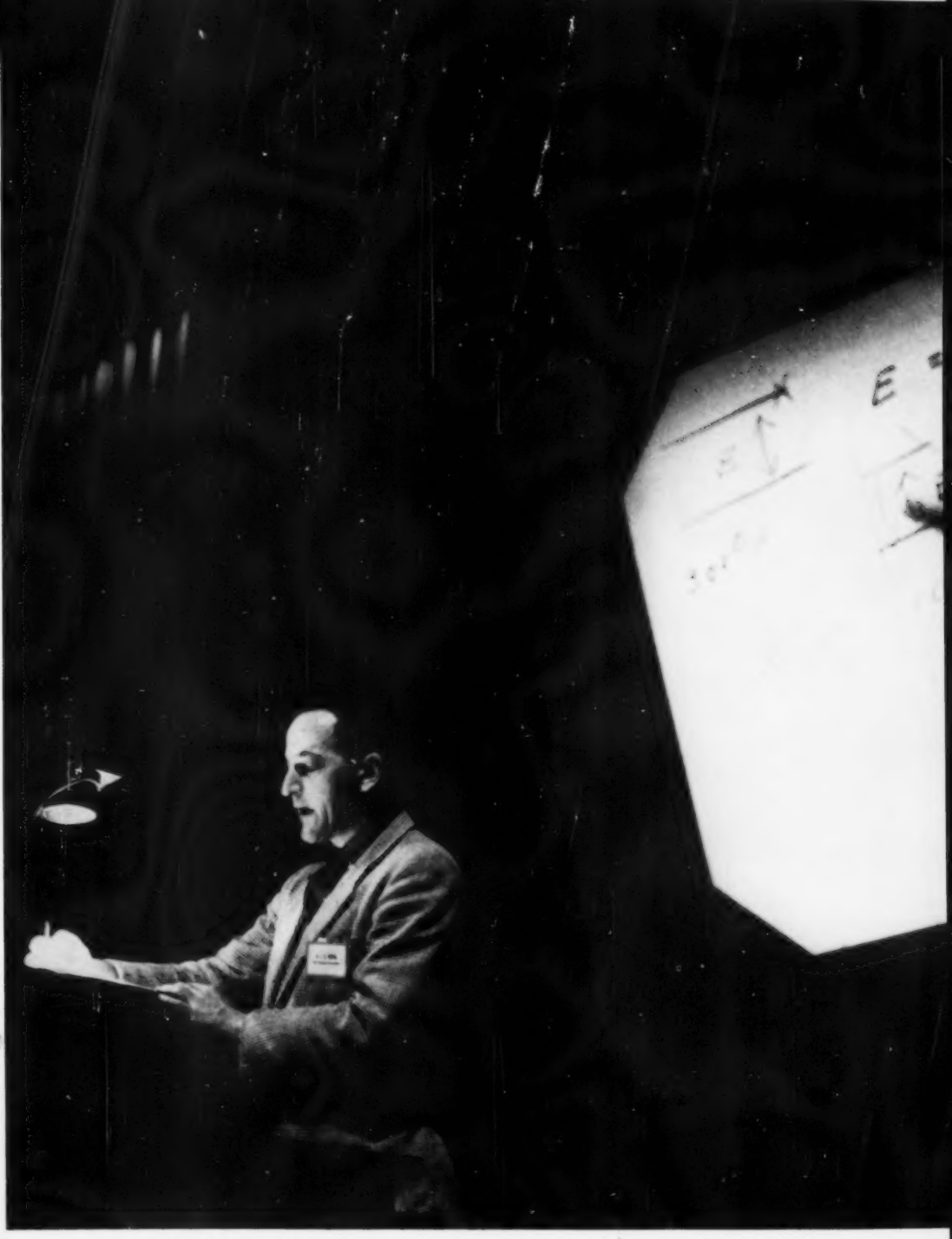
Today, as a result of similar efforts and successes, the Bell System has continuing programs underway to assist industries such as the airlines, trucking, power, department store, hotel-motel, railroad, pipeline and telephone answering services. Others are about to start with more to follow. By thus helping our customers to prosper and profit, the Bell System will, too.

Training *of Bell System salesmen was an important step in bringing Marketing's brokerage "package" to the attention of the brokerage community. In this "class" Joseph Silvestri of A.T.&T. Marketing is seen stressing key points in the package to a group of salesmen.*

TOMORROW'S SCIENTISTS VISIT THE LABS

The Bell Laboratories had some very special—and extra enthusiastic—visitors to its Murray Hill Laboratories this last Spring. They were selected groups of high school science students and their teachers on scheduled visits—one way in which the Bell Companies are helping to promote better education and further scientific achievement in the U. S. Students for these visits are selected by local school systems on the basis of a quota system administered by the sponsoring Bell Companies. Primary purpose of the visits is inspirational—an exposure of top students and teachers to Bell Labs scientists and scientific endeavor with the hope that they will be encouraged to pursue excellence in their studies and in their life work. The teachers say they gain as much as the students. They report that they take away a wealth of valuable, up-to-date information for future classroom application.

Complete absorption *is evident as visiting students listen intently to space communications lecture presented in the Murray Hill auditorium.*

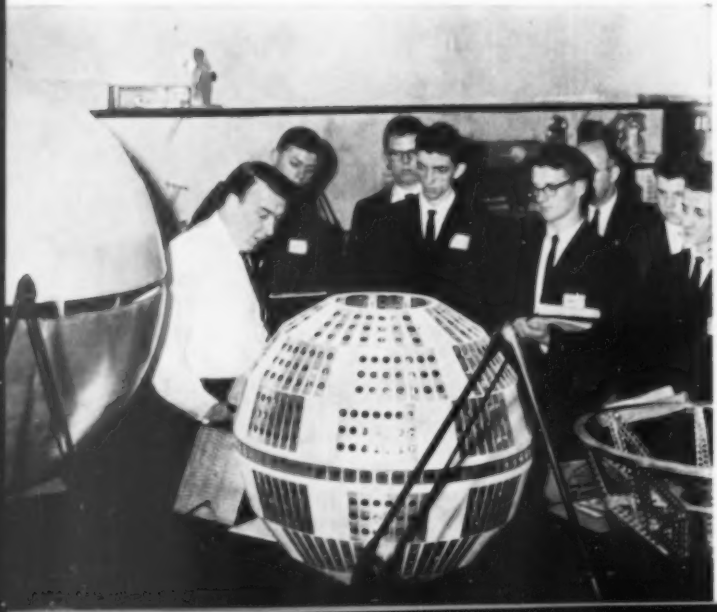


Mathematical rationale *underlying the operation of the maser is explained to the assembled students by Dr. H. E. D. Scovil of Bell Laboratories.*

Nobel Prize winner *Dr. W. H. Brattain talked to the students after lun. .on. The inspiring effect of his words was evidenced in an ovation.*

The Experience Was Varied, Fast-paced

The program for the visitors began on the evening prior to the tour with a dinner at the Hotel New Yorker. After dinner the guests heard talks on "career guidance" and "introduction to the Labs." These were followed by informal round table discussions between the teachers and students from various parts of the country. Early the next morning the guests arose, breakfasted and made ready for a fast-moving schedule at Murray Hill. Some of the highlights are seen on these pages.



Space communications *experiments at Labs for Bell System projects now under way are described to students by H. P. Kelly.*

Leg stretching *combines with chit-chat as group of students moves between individual laboratories at Murray Hill.*

Transmission *device is used as illustration by F. J. Witt of Bell Labs during discussion of transmission principles.*

As The Visit Unfolded, Interest and Excitement Grew

Keen-eyed interest . . . excitement . . . pleasure . . . were mirrored in the faces of students and teachers. What did they think of the visit? Consider these endorsements:

A science teacher writes . . . "I found the experience to be extremely stimulating . . . It definitely added to my growth professionally . . ." Another says . . . "It has been my good fortune to see . . . many important laboratories and scientific installations . . . but I was never so profoundly impressed as by the precise and extensive work being carried on at the Bell Telephone Laboratories." And yet another remarks . . . "It is encouraging to a teacher to learn that we are not alone in our effort to upgrade instruction, to know that we have the earnest support of men such as these, [Labs scientists] and of a company such as the Bell System, which is willing to underwrite the cost of this unique educational opportunity." A student writes . . . "I think it would be of interest to you to know that even though I had already been interested in science and technology this visit certainly stimulated me enough to be reassured that I'm justified in pursuing [it] further . . ." Another says . . . "Dr. Brattain's talk at the luncheon has affected my future plans . . . when I enter college in the fall of 1962, I intend to study . . . in the fields of engineering and mathematics."

Boy meets girl *as one of nature's more pleasant laws asserts itself in this hall of science.*

Close rapport *between Labs people and guests is illustrated as Dr. F. H. Winslow reaches into audience to make a point.*

Lunch-time *and youthful exuberance adds happy overtones to the basic seriousness of the occasion.*

For future reference.
A student takes notes during one of the lectures as his teacher listens intently. Note taking was much in evidence in the group all during the visit.

Of space and time.
A serious student studies an exhibit of some of man's recent accomplishments, including the Bell Solar Battery, and—perhaps—wonders how soon he might earn the opportunity to share in such discovery.

Exchange of ideas *and views occurred frequently throughout the day. Every stop or rest period became a focal point for discussion. The group seemed eager to talk, to probe into areas of special interest and their hosts were amenable.*

Farewell huddle *took place under Labs legend by Harold De Forest Arnold which reads: "Research is the effort of the mind to comprehend relationships which no one has previously known and in its finest exemplifications it is practical as well as theoretical: trending always toward worthwhile relationships, demanding common sense as well as uncommon ability."*

Recap. *Ride to airport gives students and their teachers a chance to talk together and quietly reflect on all that they have seen and heard.*

Editorial

Needed: An Adequate Tax Depreciation Policy

TO SPUR ECONOMIC GROWTH, the Administration has proposed a tax credit of 15 per cent on new plant and equipment investment expenditures in excess of the current depreciation allowances.

Although the telephone business and most other utilities would be excluded from this proposal, the Bell System is vitally concerned with any tax revision of this kind. For it brings to attention a problem which long has been gnawing at our economy—the inadequate depreciation allowances permitted under the tax law.

Since World War II the nation's industrial plant, once the most efficient in the world, has deteriorated. Surveys have been made that indicate about one-third of the nation's plant is now so old and inefficient that it should be scrapped as soon as possible.

An important reason for this deterioration is that in the face of continuing inflation, our tax laws have continued to limit depreciation allowances to the number of dollars originally invested in plant.

When this principle was established, the purchasing power of the dollar had for some time remained relatively stable. It could be assumed then that depreciation allowances would be approximately equivalent to the purchasing power of the dollars which were initially invested.

Times have changed. Since 1940, inflation has cut the dollar's purchasing power by more than a half. With tax depreciation allowances falling far short of the original purchasing power of the dollars consumed in production, taxable income is, in reality, overstated, taxes paid are too high and the result is a tax on capital.

In May, Alexander L. Stott, vice president and comptroller of A.T.&T., appeared before the House Ways and Means Committee which conducted hearings on the Administration's tax proposals.

He suggested that "depreciation allowances must be equivalent to the purchasing power of the original investment in the assets being consumed in production or the capital invested in the business will be taxed away in the guise of income."

The erosion of capital through inadequate depreciation allowances impedes the modernization and expansion of the nation's industrial plant and impairs the nation's competitive position in world markets.

Because the Administration's 15 per cent tax credit plan would be superimposed on our present inadequate depreciation allowance tax structure, it would have only a limited success in stimulating growth, Mr. Stott said. Inadequate depreciation would still be siphoning off capital.

Mr. Stott suggested that adequate tax depreciation allowances would establish a basis for sound, dynamic growth. To this end, he advised "price level depreciation" which would allow taxpayers depreciation based upon the original cost of their property, with dollar amounts being adjusted to reflect changes in the purchasing power of the dollar. The U.S. Treasury Department could prescribe an index such as the Consumer Price Index for adjusting to recognize the change in the purchasing power of the dollar.

The cost to the government of adopting price level depreciation for tax purposes "would not be prohibitive," Mr. Stott said. If all industry were to use price level depreciation and if taxpayers could not use more liberal depreciation on their returns than they use on their books, "the immediate annual revenue loss would not be much over $2 billion." This loss would "rapidly be made up by the continuing stimulus that the change would give to the economy."

Mr. Stott pointed out that the answer to the depreciation problem does not lie in further acceleration of depreciation. Such acceleration as is presently contained in the tax law offsets the effect of inflation only incidentally and to a minor degree—it affects only the timing of deductions and not the total of dollars allowed.

As President Kennedy pointed out in his tax message, "A speedup in depreciation only postpones the timing of the tax liability on profits from investment to a later date. . . ." Accelerated depreciation is therefore a tax deferral. It is not a tax reduction as many people seem to think.

The stated purposes of the Administration's tax credit plan are to increase the growth rate of the U.S. economy; to bring American costs down on the international market so as to meet low-cost foreign competition; and also to create job opportunities for our growing work force.

Inadequate depreciation allowances place a barrier before these objectives. Price level depreciation removes this barrier.

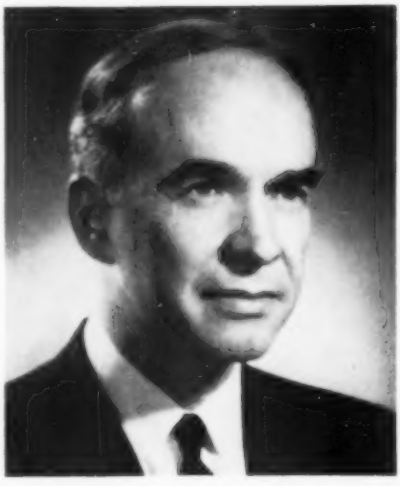
Who's Who & What's What In This Issue

In the preparation of "ETV – A Progress Report" (page 5), William S. Brown, Jr. drew upon abundant first-hand experience. He was actively associated with educational television in his previous post as marketing programs supervisor. Now, as product marketing supervisor, this fast-moving and important public service is again one of his major responsibilities.

A native of Iuka, Mississippi, Mr. Brown received his engineering degree from the University of Mississippi. He has remained an active alumnus of "Ole Miss" and is also a member of the Parents Advisory Committee of Sweetbriar College in Virginia.

While general personnel manager of Southern Bell, he pioneered in establishing that company's first continuous headquarters engineering training school, and also initiated a program of advanced technical training for Bell System Engineering and Plant people, using the classrooms, faculty and other facilities of Clemson College during the regular term. Mr. Brown feels that this background and interest in the educational field has been helpful in his ETV assignments.

Mr. Brown's career with the Bell System began in 1929, when he started in St. Louis as a student engineer with the Long Lines Department. Since then he has held various positions in the System. Prior to coming to New York for this particular assignment, he was general merchandising supervisor for Southern Bell.



William S. Brown, Jr.

Dr. George V. LeRoy, author of "Telephone Engineers' Contribution to Medical Research" (page 16) is professor of medicine at the University of Chicago. He has been closely associated with the SAVE program since its inception in 1957. He worked with Illinois Bell President William V. Kahler in setting up the first meeting between medical researchers from the University of Chicago and telephone engineers. It was from these meetings that SAVE evolved.

Dr. LeRoy is not only enthusiastic about SAVE as an important aid to medical research but believes that there are other benefits to be derived from the association of telephone engineers and medical researchers and that more frequent contacts between them are to be encouraged. In particular, he feels that many of the techniques of problem-solving used by industrially trained engineers—such as a "team" approach to problems—are worthy of careful study by people in medical research.

One of the top U. S. medical men in the field of biology, Dr. LeRoy's special field is the biological effects of radiation and related medical research, and he has produced many papers in this and in other fields. During World War II he served as an Army medical officer in the South Pacific. He was a member of the Joint Commission for Investigation of the Effects of the Atomic Bomb in Japan in 1945-46.

Dr. George V. LeRoy

John C. Swartley

"A New Look At The 1960's" is another authoritative article by John C. Swartley, A. T. & T. chief statistician, who has twice previously contributed to the pages of this magazine. In the Summer 1959 issue he contributed "Government Finances in Economic Perspective," and he was also a co-author of "The Gold Problem," which appeared in the Winter 1960-61 issue.

Mr. Swartley's extensive background of study and analysis in broad areas of economics as A. T. & T.'s chief statistician makes him especially well-qualified to write about our economic future—a topic which is of concern to all of us both in our business lives and as citizens.

Mr. Swartley entered the Bell System in June, 1924, with the Long Lines Commercial Department. He served several years there, followed by a period of employment with the Operations and Engineering Department. He returned to Long Lines in 1940,

and was general commercial engineer before going on military leave. After his wartime service, Mr. Swartley joined the Comptroller's Department of A. T. & T. as statistician, economic studies. He advanced to the post of general statistician, economic and telephone studies, in 1950 and, since 1958, he has been our chief statistician.

Lincoln R. Ward

The author of "Make It Small . . . Make It Fast . . . Make It Accurate . . ." (page 28), Lincoln R. Ward, was right in his element when he wrote about the brokerage "package" marketing program. He is abundantly qualified on two counts: one, his extensive experience with the special communications requirements of a wide variety of industrial and government customers; the other, his unbounded enthusiasm for an undertaking such as the survey of the brokerage business and the subsequent sales efforts in this field.

As major account sales supervisor for A. T. & T.'s Marketing Department, Mr. Ward is concerned with such large accounts as airlines, banks, trucking firms, and, of course, brokers. The success of the Major Account effort in drastically reducing intervals for providing service to customers, and the acceptance of the Account Manager concept, which he helped to develop and took to the Companies, have been the greatest satisfactions in his career, he says.

Prior to coming to A. T. & T. Headquarters, Mr. Ward's experience was in the Long Lines Department. There, too, he worked primarily in sales, although he also held various posts in Traffic and Plant. He handled the coordination of the Midwest television network in the early days of TV, and was a member of a Bell System team operating out of Frankfurt, Germany, to coordinate overseas telephone service to occupation troops after World War II.

In The News

- *Space Terminal Begun*
- *Coil Spring Connector*
- *U. S.-Bermuda Cable*
- *Telephone Color Changes*
- *The MILS System*
- *New Key Sets*

Construction work on the terminal building at the Space Communications station ten miles northeast of Rumford, Me., was begun early in June. This structure, to house equipment for controlling the giant rotating antenna that will be employed in experimental transatlantic communications via an orbiting satellite as well as land facilities, is expected to be completed in November. The structure will also house a computer for predicting satellite positions.

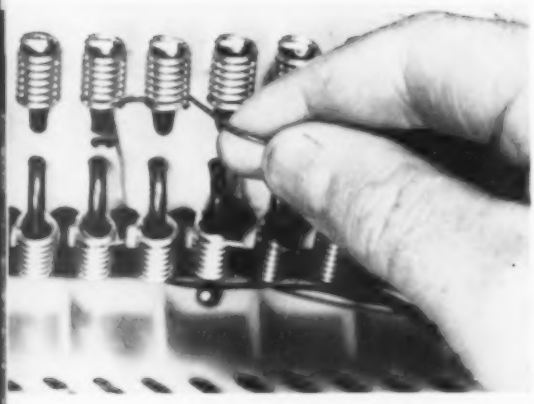
The terminal, a reinforced concrete frame building with concrete block walls, will be situated in a 1,000-acre, bowl-shaped tract surrounded by low mountains that help prevent radio interference from the earth. The Long Lines Department of A.T.&T., which is building the terminal, will also operate it when scientists and engineers conduct experiments next year in cooperation with telephone administrations abroad and with the National Aeronautics and Space Administration.

Foundation work has also been started, several hundred yards away, on the 250-ton steel and aluminum revolving antenna horn designed by the Bell Laboratories to serve as the electronic "mouth" and "ears" of the new communication system. This highly sensitive horn is three times as large as the one used for Project Echo experiments at Holmdel, N. J., being 177 feet long and 94 feet high. It will transmit signals to satellites and receive signals, relayed by satellites, from overseas.

A new device known as the Coil Spring Connector has recently been introduced which permits rapid termination of plastic insulated conductors without removing the insulation and without use of special tools. It is intended primarily for use in outside plant and will largely supersede the conventional screw-type binding posts in new construction and rearrangements.

It consists of a helical coil spring wound from tin plated phosphor bronze square wire. The wire is oriented at an angle to permit easy entry of the conductor and to control the contact area between adjacent turns. To make a connection, the insulated conductor is wrapped once around the coil and pulled between adjacent turns of the coil. The coil spring crushes and splits the insulation to make a permanent metallic connection at four points. Conductors can just as easily be removed without disturbing other wire connections in the same coil spring.

The first application of the device is being made in building terminal blocks. For this purpose, a new 25 pair block has been developed consisting of an insulated face plate with coil spring connectors located on both the front and back of the panel. The connecting block is equipped with hinged mounting brackets to permit rapid accessibility to the rear terminals. Feeder cable circuits are terminated on the rear of the panel and house cable circuits on the front. It has been specifically designed to facilitate good housekeeping. It is contemplated



Coil spring connector.

that use of coil spring connectors will be extended to all outside plant apparatus as fast as design and methods can be developed.

The first sections of the telephone cable between the United States and Bermuda were laid off the New Jersey coast as well as off the British island early in June. The new system, a joint project of A.T.&T. and Cable and Wireless (West Indies) Ltd., is scheduled to be placed in service about November 1. Initially, it will provide 48 circuits and be able to handle 80 telephone conversations at the same time.

Starting about four miles south of Barnegat Light, the new cableship *Retriever* put down 75 miles (65 nautical miles) of armored shore-end cable off Long Beach Island. A very short length—about two miles—was placed on the outer reef off Devonshire Bay in Bermuda. The connecting deep-sea portion, which will extend some 750 nautical miles, will be laid by another cable ship, HMTS *Alert*. In the U.S. the circuits will connect with the continental telephone network at a new cable terminal station built by the Long Lines Department of A.T.&T. at Manahawkin, N. J.

Decision has been reached to discontinue certain colors in telephone sets and to add white Key Sets and white Call Directors. The decision was based on the Companies' general acceptance of this proposal.

With these revisions, the standard color offering for the various sets will be as follows:

Princess	— White, Beige, Pink, Blue, Turquoise
500 Desk	— White, Beige, Pink, Blue, Green
500 Wall	— White, Beige, Pink, Yellow
500 Key	— White, Beige, Gray, Green
Call Director	— White, Beige, Gray, Green

The standard color offering for auxiliary items of equipment, for systems such as Home Interphone and Speakerphones, has been revised to correspond in general to the above.

Discontinuing low-usage colors will simplify the sales job, permit concentration on colors most customers prefer and reduce size of stocks without any serious inconvenience to customers.

Stretching seaward for thousands of miles from the east and west coasts of the United States are the elements of a vast underwater sound-detection system called "MILS"—the U.S. Navy's Missile Impact Locating System.

Used in connection with the nation's missile and space programs, the MILS

Navy frogman clears path for MILS cable.

MILS hydrophone being assembled at Western Electric.

network provides an electronic method of locating the points at which test missiles and missile nose-cones or capsules impact on the ocean's surface. Range stations chart the performance of missiles during flight, using radar and telemetry for this purpose. MILS, consisting of underwater sound receivers and shore-based electronic computing systems, operates along with these range stations to determine just where the nose-cones and capsules hit the water.

MILS has been operational for the past four years, although details of the project have only recently been made public by the Navy. To date it has located the impact points of more than 150 missiles fired from Cape Canaveral, Florida; Wallops Island, Virginia; and Vandenberg Air Force Base, California. It was developed for the Navy by Bell Telephone Laboratories. Western Electric engineered and manufactured the system, and it was jointly installed by the Navy and personnel from W.E.'s North Carolina Works.

A new family of key telephone sets designed for use by PBX attendants will be available to the Bell Telephone Companies between now and the end of 1962. The first of these—the 610 set—is already in production at Western Electric's Indianapolis Works. Two other models—the 612 and 615—are scheduled to go into production later this year and early in 1962.

All three of these new units are compact desk-consoles with sloping, cordless operating faces. All are representative of the latest innovation in PBX switchboard facilities.

The first of the new consoles to be introduced to Bell System customers is the 610, similar in appearance to a Call Director. It will be used as a replacement for cord-type switchboards and for an older attendant's console now used with the 756A PBX installations serving up to 60 telephones. By means of the rotary dial on the 610 set, the PBX operator can complete all incoming and outgoing calls for the telephones served.

A second new PBX attendants' console, incorporating special features not included in the 610, is the 612 key telephone set or Direct Station Selection Console. It will go into production this fall as an alternate standard console for use with 756A PBX installations. The 612 will provide for pushbutton completion of incoming calls and will indicate busy extension lines visually.

Third in the family of new PBX attendants' aids is the Busy Lamp Field Console, or 615 key telephone set. It is designed for use with 740E PBX installations—which serve as many as 80 extension telephones—and for use with the smaller 701 PBX installations of comparable capacity. In addition to the rotary dial, which the PBX operator will use to complete calls to extension telephones, the 615 set is equipped with 12 or 18 illuminated pushbutton keys for answering and controlling incoming calls.

Western Electric spent an average of

Making the 610 Key set.

almost six million dollars per day in 1960 for supplies and services, gross payrolls, and major new construction—a total of well over two billion dollars. As the Bell System's manufacturing and supply unit, W.E. worked on telephone activities and government contracts throughout the United States and in a number of foreign countries around the globe.

Total payments to suppliers for raw materials, telephone company supplies, and Government subcontracts amounted to more than $1,158,000,000. Added to this were payments for transportation services of about $48,000,000. Almost 40,000 supplying firms in all 50 states and in 14 foreign countries provided these goods and services. Some 90 per cent of the firms were small businesses employing less than 500 people each; and as many as 6,800 of them became Western Electric suppliers for the first time last year.

Gross payrolls of more than $838,000,000 were met by Western Electric for work performed in 48 states and overseas during the year. At the end of 1960, the company was employing about 137,000 people in its various manufacturing, purchasing, distribution, installation, defense, space, and related activities.

Major construction payments were made in 16 states, for a total 1960 expenditure of $60,400,000 in expansion and modernization. W.E.'s plant investment totalled more than a billion dollars by the end of the year.

The first four telephone circuits of the BMEWS communications network have been made available for Air Force use between the missile detection station at Clear, Alaska and Fairbanks. These are the first of 34 microwave and over-the-horizon radio stations being installed by W.E. for early warning of ballistic missile attack.

A recent change in the Traffic Operating Practice provides for a more liberal use of the Yellow Pages directory by information operators. The conditions under which the operator will consult the Yellow Pages are: when the customer does not have the Yellow Pages for the desired place, or when he is not able to use them or he can not find what he wishes, or when the information operator is unable to find the information that the customer wishes in her regular records and she feels that a search in the Yellow Pages might be helpful. In using the Yellow Pages where there is more than one listing which fits the condition, it is not intended that the operator will make a selection for the customer but instead that she will mention any listings which might be helpful to him in making a selection.

RECORD ATTENDANCE. Nearly 19,000 share owners attended the 1961 annual meeting of A. T. & T. This was the largest attendance ever recorded by any business. There was full and free discussion of many matters – evidence of democracy at work.

Now...2,000,000 Bell Telephone Share Owners

A NEW MILESTONE IN DEMOCRACY AND AMERICAN BUSINESS

The ownership of the country's largest business by over two million people is a dramatic testimonial to the American economic system. Here, for all the world to see, is democracy at work.

The result is a communications service of increasing value to both the public and business and a vital element in national defense.

The owners of American Telephone and Telegraph Company stock are people in all walks of life, in every section of the country.

A great many are small share owners. About 290,000 own fewer than ten shares. 42% are women. An additional 31% are joint accounts, generally in the names of husband and wife. More than 300,000 are telephone employees.

In addition to the direct owners, many millions of other people have an important, beneficial interest through the holdings of their insurance companies, pension funds, investment companies, unions, savings banks, etc.

Without the money that A. T. & T. share owners have put in the business, you could not possibly have the telephone service you enjoy today. Nor would there be work and wages for over 730,000 employees.

This year alone share owners have furnished $961,000,000 in new capital by subscribing to A. T. & T. stock.

Given the opportunity to plan boldly for the future—and with earnings on a level that makes such progress possible—you can be sure that we will make further contributions to the growth and security of the nation.

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